

# APPLICATION UNDER UNITED STATES PATENT LAWS

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Invention: PALLET NAIL WITH ENLARGED HEAD

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## This is a:

- ☐ Provisional Application
- ☐ Regular Utility Application
- ☒ Continuing Application
  - ☒ The contents of the parent are incorporated by reference
- ☐ PCT National Phase Application
- ☐ Design Application
- ☐ Reissue Application
- ☐ Plant Application
- ☐ Substitute Specification
  - Sub. Spec Filed \_\_\_\_\_
  - in App. No. \_\_\_\_\_ / \_\_\_\_\_
- ☐ Marked up Specification re
  - Sub. Spec. filed \_\_\_\_\_
  - In App. No \_\_\_\_\_ / \_\_\_\_\_

## SPECIFICATION

## **PALLET NAIL WITH ENLARGED HEAD**

**[0001]** This application constitutes a continuation-in-part of and claims priority from Application Nos. 10/060,411, 10/060,413 and 10/067,150, all filed February 1, 2002 and hereby incorporated by reference in their entirety.

### **BACKGROUND OF THE INVENTION**

**[0002]** The underlying concept embodied in the packaged nails suitable for sheathing disclosed in the above-identified applications and the improved results achieved thereby in sheathing construction have now been found to be applicable to pallet constructions.

**[0003]** Pallets are conventionally constructed of wood boards. An example of a typical pallet is formed in three layers. The bottom layer includes three parallel boards of a size, for example, of 3/4" x 3" oriented with the larger disposed sides horizontally. The middle layer includes heavier boards of a size, for example, of 1 1/4" x 3 3/8". These boards are oriented with the larger sides disposed vertically and disposed with their longitudinal extent extruding perpendicular to the longitudinal extent of the bottom boards. These heavier middle boards are preferably recessed along their lower surfaces between the bottom boards to accommodate the forks of a conventional fork lift truck. The top layer includes a series of parallel boards like those of the bottom layer, as for example, seven, oriented in the same way as the bottom layer but more closely spaced. Typically, the boards are held together by common nails. In many cases, these common nails are packaged as dual wire mounted coils in a form to be driven by a pneumatically actuated fastener driving device. Typically, two nails are driven through each of the bottom and top boards into each of the three heavier middle boards.

## SUMMARY OF THE INVENTION

[0003] The present invention contemplates an improvement in the operating characteristics of conventional pallet constructions by utilizing packaged nails embodying the underlying concept and construction of the sheathing nails disclosed in the earlier applications identified above.

[0004] In accordance with the principles of the present invention, these enhanced operating characteristic are obtained by providing a pallet construction in which the bottom and top boards are secured to the heavier middle boards by nails which are constructed in accordance with the principle of the present invention so that each nail has a substantially round head having a flat top surface suitable for being driven into a flush relationship with an exterior surface of a pallet wooden board and a bottom surface, the head further having a head diameter, the head diameter providing an enlarged bottom head surface area for engaging a flat surface of a top or bottom pallet wooden board to enhance resistance to pallet wooden board separation by head pull through each nail includes a single elongate shank integral with the head and extending from the head bottom surface, the elongate shank further including a point opposite the head, and a plurality of surface deformations formed on the shank, the surface deformations being configured to provide an enhanced resistance to pallet wooden board separation by withdrawal of the nail shank from a pallet wooden board, the shank further having a substantially round cross-section having a shank diameter between .092 in. and .148 in. Each nail is manufactured from steel wire; each nail has a length defining the distance from the head to the shank point, the length being between 1.625 inches and 3.00 inches; and the ratio of the head diameter to shank diameter of each nail is between 2.70 and 3.37.

[0005] The invention also embodies a method of making a pallet utilizing the aforesaid nails and a coiled package of the aforesaid nails held in collated relation by suitable flexible elongated structure such as parallel wire as well as the construction of each nail itself.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Figure 1 is a perspective view of a pallet embodying the principles of the present invention looking down at one corner thereof;

[0007] Figure 2 is a top plan view of the pallet shown in Figure 1;

[0008] Figure 3 is an end elevational view of the pallet shown in Figure 1, the opposite end view being the same;

[0009] Figure 4 is a side elevational view of the pallet shown in Figure 1, the opposite side view being the same;

[0010] Figure 5 is a bottom plan view of the pallet shown in Figure 1;

[0011] Figure 6 is an enlarged fragmentary sectional view taken along the line 6-6 of Figure 2;

[0012] Figure 7 is an elevational view of a flattened segment of a coiled package of nails embodying the principles of the present invention; and

[0013] Figure 8 is an enlarged sectional view taken along the line 8-8 of Figure 7.

#### DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

[0014] Referring now more particularly to the drawings therein shown in Figures 1-5, a pallet, generally indicated at 10 which embodies the principles of the present invention. The pallet 10 includes a plurality of bottom wooden boards 12 having parallel bottom and top flat surfaces 14 and 16. The bottom flat surfaces 14 are disposed in a position to engage a horizontal surface when the pallet 10 is supported on a horizontal surface in accordance with its usual mode of usage. As shown, there are three bottom boards 12 disposed in parallel relation with respect to one another at opposite sides or ends of the pallet and in the central portion of the pallet.

[0015] The pallet 10 also includes a plurality middle wooden boards 18, each having parallel bottom and top ends 20 and 22. As shown, there are three middle boards 18 interrelated with respect to one another in parallel relation and with respect to the bottom boards 12 in perpendicular relation. The three middle boards 18 are oriented in the pallet 10 like the bottom boards 12, that is, at opposite ends or sides of the pallet 10 and in the central portion thereof. Each middle board 18 is mounted on the bottom boards 12 with the bottom end 20 of each middle board 18 in engagement with the top flat surface 16 of the bottom boards 12.

[0016] The pallet 10 also includes a plurality of top wooden boards 24 having parallel bottom and top flat surfaces 26 and 28. As shown, there are seven top boards 24 which are interrelated with respect to one another in equally spaced parallel relation and with respect to the middle boards 18 in perpendicular relation. The top boards 24 are mounted on the middle boards 18 with the bottom flat surfaces 26 of the top boards 24 in engagement with the top end surfaces 22 of the middle boards.

[0017] The middle boards 18 of the pallet 10 have their lower portions recessed, as indicated at 30, at positions between the bottom boards 12. The recesses 30 are spaced apart and configured to receive the forks of a conventional fork lift truck.

[0018] In accordance with the principles of the present invention, the boards 12, 18 and 24 of the pallet 10 are secured together by a series of steel nails, each of which is generally

indicated at 32. As shown, two spaced nails extend through each bottom and top board 12 and 24 and into a middle board 18 at the position of engagement therewith.

[0019] In accordance with the principles of the present invention, the nails 32 are initially in a collated package suitable to be driven by conventional power operated fastener driving devices, examples of which are disclosed in U.S. Patent Nos. 5,683,024 and 4,858,812, the disclosure of which is hereby incorporated by reference into the present specification. The package may be in stick formation or coil formation, an example of a coil formation package used with the device of the patent is disclosed in U.S. Patent Nos. 3,450,255; 3,543,987; and 4,319,705, the disclosure of which is hereby incorporated by reference into the present specification.

[0020] Figure 7 illustrates a number of collated nails 32 held in collated relation by a pair of wires 34 welded to shanks 36 of the nails 32. The collation configuration of the nails 32 is parallel and in generally longitudinally coextensive relation. The nails as shown, are slightly offset longitudinally so that the collated array is slightly angled to accommodate a slightly downwardly inclined fastener feed track of a driving device leading from the coil container to the fastener drive track of the device. This configuration makes a doomed coil formation easier to form with the heads of each volute of the coil being disposed below the heads of the preceding volute. Flat coils can be made by positioning the heads of alternate volutes above the heads of the preceding volute rather than below.

[0021] Integrally formed at the upper end of the shank 36 of each nail 32 is a substantially round head 38 having a flat top surface suitable for being driven into a flush relationship with a flat surface of a bottom or top pallet board 12 or 24. The head 38 has a head diameter, providing an enlarged bottom head surface area for engaging the exterior surface of the pallet board 12 or 24 to enhance resistance to pallet board separation by head pull through.

[0022] The elongate shank 36 extends from the bottom surface of the head 36 and includes a point 40 opposite the head 38. The shank 36 also includes a plurality of surface deformations formed on the exterior periphery of the shank 36 configured to provide an enhanced resistance to pallet board separation by withdrawal of the nail shank from a pallet board 12 or 24. Preferably, the shank 36 has a substantially round cross-section having a shank diameter between .092 in. and .148 in.

[0023] Each nail 32 is manufactured from steel wire. Each nail 32 has a length defining the distance from the head 38 to the shank point 40 of between 1.625 inches and 3.00 inches. The ratio of the head diameter to shank diameter of each nail 32 is between 2.70 (i.e., 2.70:1) and 3.37 (i.e., 3.37:1). More preferably, the ratio is between 2.75 and 2.95.

**[0024]** Preferably, the surface deformations of each nail 32 are in the form of a plurality of spiral flutes 42 extending radially outwardly from the shank 36, thus forming a screw shank. As shown, the plurality of flutes 42 includes five equally spaced flutes 42 each having a spiral configuration which extends approximately once around the shank 36 of each nail 32. The flutes 42 remain uninterrupted at the regions where wire collation 34 is welded thereto. This is achieved by a direct current welding operation.

**[0025]** The nails 32 are preferably coated with a polymer coating composition that facilitates driving of the nail by slightly melting and thus acting as a lubricant during driving into a pallet board, and then subsequently acting as an adhesive to enhance anti-withdrawal characteristics of the nail. The coating is preferably provided with a colorant to further distinguish the nails from other steel nails. The coating is most preferably a water based acrylic compound.

**[0026]** In a preferred embodiment of the nail 36, the shaft diameter is approximately .099 in., the head diameter is approximately .281 in., and the ratio of head diameter to shaft diameter is approximately 2.83. Each nail point 40 is of blunt chisel configuration and the length of each nail 32 is most preferably one of the following dimensions: 1.75 in., 2 in., 2¼ in., or 2½ in.